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EVALUATION OF GUAVA GERMPLASM FOR GROWTH, QUALITY AND YIELD ATTRIBUTES SUITABLE UNDER SODIC SOIL CONDITIONS

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ABSTRACT

Guava (*Psidium guajava* L.) popularly known as the "Apple of the Tropics", has gained considerable prominence on account of its high nutritive value, availability at moderate prices and pleasant flavour. It is a rich source of vitamin C and pectin, moderately good source of calcium and a fair source of phosphorus. The study was carried out to evaluate the guava (*Psidium guajava* L.) germplasm for growth, yield and quality under sodic soil condition. Totally 31 accessions of guava germplasm were collected and planted in RBD with 4 replications at Orchard, Horticultural College & Research Institute for Women, Tamil Nadu Agricultural University, Trichy and evaluated for 5 years (2014 to 2018) under sodic condition. Growth observations on plant height (m), trunk circumference (cm), plant spread (E – W) (m) and plant spread (N – S) (m) and tree volume (cm³) were recorded. Further, yield and quality attributes viz., number of fruits tree⁻¹, fruit length, fruit diameter, average fruit weight, fruit yield tree⁻¹, pulp colour, flesh thickness, rind thickness and TSS were also recorded. Among the guava germplasm, "Surka Chitti Natputani" was found to be vigorous in growth habit followed by "Mirzapur seedling" whereas dwarfness and erect growth were observed in "Cheeni guava". The accession "Nasik" recorded the highest fruit yield (26.285 kg tree⁻¹) followed by "Mirzapur Seedling" (24.277kg tree⁻¹). Dessert quality attributes viz., rind thickness, soft seed and total soluble solid were found to be best in "Allahabad Safed". The present studies impart knowledge on morphological, quantitative variation and quality parameters of guava fruits and can be useful for producers, breeders, and processors. The salt tolerant genotypes having the capable of maintaining osmotic potential and providing more food materials.

Keywords : Guava, germplasm, osmotic potential, quantitative variation, sodicity tolerance.

Introduction

Guava (*Psidium guajava* L.) is a popular fruit among the consumer and farmer because of its rich flavour, aroma, minerals and nutrients. Guava is native to tropical America stretching from Mexico to Peru. It grows very well in tropical and subtropical climate and it is fourth most grown fruit in India. The fruits are delicious aroma (Moon *et al.*, 2018); (Prakash *et al.*, 2002; Rai *et al.*, 2010) and has low content of carbohydrates, fat and proteins, rich in vitamin C, pectin and photochemical (Fernandesa *et al.*, 2014) such as polyphenols and carotenoids with minerals like calcium, phosphorus and iron and used as fresh as well as for making jam, jelly, nectar, marmalade, paste, cake and biscuits etc (Patra *et al.*, 2004). Besides leaves, roots, bark and immature fruits are used in local medicines to treat gastroenteritis, diarrhea and dysentery. The pectin present in this fruit plays a significant role in the reduction of cholesterol and thereby decrease the risk of cardiovascular disease. Guavas are also used for therapeutic benefits for metabolic disorders, gut infection, diabetes, obesity and its basic nutrition creates a future surge of research and development in the food industry. The potential antioxidants and antimicrobial activity of guava is promising with spray dried fruits (Fernandesa *et al.*, 2014). It is one of the important and oldest cultivated crops due to

its high phenotypic variability and hardy nature and the wide adaptability of the different environmental condition. The guava trees produce fruit all round the year (Zamir *et al.*, 2003; Rahman *et al.*, 2003). In India, about 2.65 million hectare area under guava, producing 4.054 million tonnes of fruit. Bihar is the leading state in guava production followed by Andhra Pradesh and Uttar Pradesh. In Tamil Nadu the area under cultivation is 9,691 ha, producing 1, 55,058 MT/ha with the productivity of 16 MT/ha. Season of availability is markedly governed by agroclimatic conditions. Guava produced in Allahabad region is the best quality in the World. A large number of named cultivars are available in India, however, only a few like Allahabad Safeda and Lucknow-49 are found to be high yielder and superior quality occupied the major area under its cultivation. It is being cultivated on large areas in India for its high adaptability to varied soil and climatic conditions (Sharma, 2009). Efforts have been taken over to widen the genetic base through creating new variability and utilizing it for selection of elite varieties and hybrids for the commercial cultivation. A variety within built resistance to the abiotic stress besides high yielding capacity of good quality fruit is still lacking. Among different stress prevailing, soil sodicity is an abiotic stress which hampers growth and yield of many

crops across the globe. More than 100 countries in the world have salt affected soil with a varied extents, nature and properties (Rangasamy, 2006). Soils become sodic when the exchange surfaces of clays become dominated by sodium (Na) instead of calcium (Ca) (Qureshi and Barret- lennard, 1998) which deteriorates the soil physical and chemical properties. This might exert important secondary effects on plants, thereby causing poor aeration, low water availability and nutrient deficiencies and toxicities (Wright and Rajpar, 2000). The growth and yield found to be good upto the pH level of 8.0 and electrical conductivity of 1.0 ds/m. Beyond that the guava plants grown in salt affected soils lose their bearing after few years. For this reason, it is important to collect, characterize and use outstanding materials having comparative advantages such as fruit size and form, external/internal color, seed number, pulp thickness, vitamin C content etc under sodic condition prevailing more areas in Tamil Nadu. Thus, a germplasm collection was established to increase the genetic base of guava as an *ex situ* conservation strategy. Hence, the present study was undertaken with the following objectives

1. Survey, collection and establishment of guava germplasm in sodic soil region
2. Screening, identification and selection of promising sodicity tolerant guava accessions for yield and quality parameters.

Materials and Methods

Survey and guava collection

Survey and collections were made all over India during 2014, June, South West Monsoon. Totally 31 different accessions of guava were collected, planted and evaluated for growth, yield and quality parameters under sodic condition prevailing at Horticultural College and Research Institute for Women, TNAU, Trichy. The field experiment was laid in Randomised Block Design (RBD) with 4 replications and continuously evaluated for 5 years (2014 to 2018). The established trees started bearing in 2016 onwards.

Soil conditions

The soil is characterised by pH of 8.7, electrical conductivity (EC) of 1.3 dsm^{-1} and exchangeable sodium percentage (ESP) of 15%. The irrigation water recorded pH of 8.4 and EC of 1.87 dsm^{-1} and 15% of Residual Sodium Carbonate (RSC). The orchard is situated in Agro ecological region 8 (Eastern Ghats and Tamil Nadu uplands and Deccan plateau, hot semi-arid region) and located at 10^o45'N Latitude and 78^o36'E Longitude. During the growth season of 2016, several guava trees started their reproductive stage and produced some fruits. When the crop is in 3 years old, biometrical observations were recorded to analyse the variation in morphological characters.

Growth attributes

Growth observations on tree height (m), trunk circumference (cm), tree spread (E-W) and (N-S) (m) and tree volume (cm^3) were made. Yield and quality attributes viz., number of fruits tree^{-1} , fruit length, fruit diameter, average fruit weight, fruit yield tree^{-1} , pulp colour, flesh thickness, rind thickness and Total Soluble Solids (TSS) were recorded. The height of an individual tree was measured in metre from ground level to the top of the crown with the help of measuring tape and mean value was worked out.

Trunk girth of each tree was measured in centimetres with the help of measuring tape at 25 cm above the ground level and average was calculated. The spread of the tree was measured in meter on both the directions *i.e.* North- South and East-West and their mean was recorded.

Fruit yield and quality characters

Fruits were harvested after attaining full maturity from each tree and the total number was recorded. The average weight of fruit in each accession was multiplied with respective accessions with by total number of fruits and yield tree^{-1} (kg) was calculated and the mean was worked out. The harvested fruits were visually observed to record the shape. The individual fruit length (cm) of five representative fruits was measured by using vernier caliper and average length of fruit was recorded in cm. The individual fruit width (cm) of five representative fruits was measured by using vernier calliper. The weight of five fruits was weighed on electronic balance and results expressed as weight in grams per fruit. To measure the thickness of pulp, the fruits were equally divided into two by cutting and length between skin and seed ball was measured with the help of scale in centimetre. The fruits pulp colour was noticed as per visual observation as white, creamy-white, greenish-white, yellowish, pink, light red and dark red. Assay method was followed in ascorbic acid as given by Ranganna (1986). The total soluble contents of the guava juice were quantified at harvest. The determination of total soluble solids (TSS) measured by using the Digital refractometer (RX 5000, ATAGO, and Japan). A drop of juice was placed on the prism of refractometer, the lid was then closed and TSS was noted directly from the digital scale of refractometer at room temperature and was expressed in ° Brix.

Statistical analysis

The data were analysed statistically as per the method suggested by Pansey and Sukhatme, (1985).

The results obtained in the present study on evaluation of guava germplasm for growth, yield and quality characters are discussed here under in the light of established facts and figures available in the literature.

Result and Discussion

The data showed that all the genotypes are significantly different from each other in tree height, circumference and plant spread and volume (Table 1). All the accessions showed significant difference in plant height, circumference, plant spread and volume.

Plant growth parameters

The guava germplasm 31 accessions were investigated to determine the growth and yield traits could be useful for the specific genotypic identification. This growth, yield and quality traits have proved useful for identifying genotypes in population of guava and other fruits (Rodrigue *et al.*, 2004, 2007, 2008) and Agustin *et al.*, (2006). The tree height ranged from 1.12 m to 4.36 m. Maximum tree height (4.36 m) and circumferences (22.27 cm) were recorded in "Surka Chitti Natputani" followed by "Mirzapur Seedling" with the value of 2.67 m and 21.37 cm. In contrast, Cheeni Guava had the most negligible tree height (1.12 m) and circumferences (9.71 cm). Similar results were obtained in guava by Dubey *et al.* (2002), Singh *et al.* (2011) and Ulemale and Tambe (2015). The maximum plant spread of E – W (3.30 m) and N-

S directions (3.26) were recorded in “Surka Chitti Natputani” followed by “Mirzapur Seedling” having a score of 2.86 m and 3.12 m respectively. While, Cheeni guava had the minimum plant spread of E–W (0.68 m) and N–S directions (0.76 m). The results are in agreement with Pandey *et al.* (2016) in guava. These findings are in broad conformity with the findings of Jadhav (2012) in sweet orange, Singh (2003) and Meena *et al.* (2013) in guava.

Fruit yield and quality parameters

The data showed that the genotypes differed significantly with respect to their yield and quality attributes (Table 2). Tree type showed variation among the different genotypes and out of the 31 genotypes, 3 were erect genotypes and 28 genotypes were spreading type. Smoothness of the stem type showed variation among the genotypes and out of 31 genotypes evaluated, 23 were found to be have rough texture and 8 were found to be smooth. In leaf type, 2 were elliptical, one was lanceolate, one was oblong and one was ovate. In leaf margin, 13 entire and 18 undulated surfaces were observed. In leaf base, 29 found to be acute and 2 obtuse were noticed. The maximum number of fruits tree⁻¹ (210.10 nos.) was found in “Panneer Guava” which was comparable to “Nasik” which had a value of 204.80 nos. “Sabdana Badari” had the fewest number of fruits tree⁻¹ (44.16 nos.). Similar findings were made in guava by Marak and Mukunda (2007) and Babu *et al.* (2007) (Fig.3). The maximum fruit length (cm), diameter (cm) and flesh thickness were observed in “Surka Chitti Natputani” (11.55, 8.71 cm and 6.59 cm) followed by “Allahabad Safed” (7.80 cm, 6.87 cm and 5.59 cm) and minimum values were recorded in “Cheeni Guava” (2.73 cm, 2.41 cm and 1.63) respectively. The size of the fruit is having variable character is influenced by the crop load on the tree *i.e.* number of fruits per tree. These findings are in agreement with the work of Patel *et al.* (2007) and Pandey *et al.* (2016) in guava. Surka Chitti Natputani had the maximum fruit weight (315.05 g) followed by Allahabad Safed” with a value of 202.33 g. In Cheeni Guava, the minimal value for the fruit weight (23.61 g) was observed (Fig.4). These findings are in accordance with Babu *et al.* 2007, Aulakh (2005), Gohil *et al.* (2006), Athani *et al.* (2007), Mitra *et al.* (1983) Singh (2003), and Anonymous, (2010) in guava.

The maximum fruit yield (26.285kg tree⁻¹) was recorded in Nasik followed by “Mirzapur Seedling”, which had a value of 24.277kg tree⁻¹. Cheeni Guava had the lowest value for stem diameter (3.009 kg tree⁻¹). On the basis of fruit colour, the genotypes were grouped into three categories Dark pink flesh, pink flesh and white flesh. Dark pink flesh was observed in “Arka Kiran” (Fig.5). Pink flesh colour was observed in “Lalit”, “Red Fleshed”, “Hafsi”, “Philli Pink”, “Mirzapur Seedling” and “Cheeni guava”. The rest of the genotypes were found to be white fleshed. The similar kind of observation was made in an evaluation study with 25 varieties under Basti (Uttar Pradesh) conditions (Singh, 1988). Singh (2003) studied yield variability of guava cultivar. Seed type showed variation among different genotypes *viz.*, hard and soft seeded. Among 31 genotypes, “Red fleshed”, “Arka Kiran”, “Chakaiya Ruthumanagar”, “Dareedar”, “Karela”, “Mirzapur seedling”, “Nasik”, “Allahabad Safeda”, “Lalit”, “Bapatla”, “Hafsi”, “Lucknow 46”, “Panneer Guava”, “TRY (G) 1” and “Chittidar White” were soft seeded but “Benaras”, “Dharwad”, “Philli Pink”, “Sabdana Badari”, “Superior Sour Lucidum”, “Surka

Chitti”, “Surka Chitti Natputani”, “Lucknow 49”, “Chinese Guava”, “Chittidar”, “Bangalore Round”, “KG Guava”, “Local”, “Red Guava” and “Cheeni Guava” found to be hard seeded. The “Seedless” genotype of triploid variety produced seedless fruits with irregular shape of fruits. This in accordance with small, irregular and misshapen fruits of triploid seedless varieties by the authors Raman *et al.*, 1971; Negi and Rajan, 2007 and Nimisha *et al.*, 2013.

The data showed that the genotypes differed significantly with respect to their quality attributes (Table 2). The the most minor rind thickness was recorded in “Allahabad Safed” (0.11 cm) followed by “Chittidhar White” and “Cheeni Guava” (0.14 cm) and maximum was observed in “Surka Chitti Natputani” (0.60 cm). Less non-edible waste in genotype “Chittidhar white” might be due to the maximum fruit weight of this genotype with less peel thickness. Similar results were obtained by Choudhary (2004) in guava. The maximum ascorbic acid (372.17mg/100g) was recorded in “Surka Chitti Natputani” followed by “Mirzapur Seedling” with 370.69 mg/100g and the minimum ascorbic acid (182.50mg/100g) recorded in “Dharwad” (Fig.6). The dessert qualities *viz.*, rind thickness, soft seed, TSS found to be good in “Allahabad Safed” followed by “Chittidar White” under sodic soil condition. The maximum TSS was recorded in “Arka Kiran” (17.22° Brix) followed by “Mirzapur Seedling” with a value of 17.16° Brix. The minimal value for TSS (10.30° Brix) was observed in “Benaras” (Fig. 7). Fruit taste is influenced by the TSS and acidity, besides by the genetic makeup of the individual genotype and climatic condition of the locality. The genotypes showed a great variability with respect to tree height, trunk circumference, tree spread and tree volume. The canopy spread might be due to difference in inherent characters of germplasm as well as the age of the tree. Similar results were reported by Kale (2009) in sweet orange, Nehi and Rajan, 2007 and Pandey *et al.* (2016) in guava. Many of the above traits are of significant economic importance and it could be used as breeding targets to increase fruit yield and quality attributes under sodic soil condition (Mehmood *et al.*, 2014). Yield and quality attributes *viz.*, fruit length, fruit diameter, average fruit weight, number of fruits tree⁻¹, fruit yield tree⁻¹, pulp colour, flesh thickness, rind thickness and TSS etc. also registered greater differences among the genotypes despite the sodicity problem. These findings underline the important richness of *Psidium guajava* germplasm provide prospects for the development of new cultivars suitable for sodic soil area.

Conclusion

The evaluation study on elite guava genotypes has revealed that variability existed in different growth, yield and fruit quality attributes. From the investigation, it is concluded that “Nasik”, “Mirzapur Seedling”, “Allahabad Safeda”, “Surka Chitti” and “Benaras” were superior to other genotypes in relation to different physico-chemical and yield parameters of fruits under sodic soil condition. The other genotypes *i.e.*, “Bapatla”, “Chittidhar White”, “Lucknow 46” and “Seedless” were also superior in some of the characters as compared to rest of the genotypes. Among them “Nasik” registered maximum fruit yield tree⁻¹ (26.42 kg tree⁻¹) followed by “Mirzapur Seedling” with the value of 24.28 kg tree⁻¹ and minimum value was noticed in “Cheeni guava” even under high sodicity level. “Allahabad Safed” recorded good flesh thickness, soft seed and minimum rind thickness. Maximum number of fruits with sweet taste with panneer

flavour, soft seeds, less rind thickness were observed in Panneer guava. Panneer guava could be recommended for homestead garden. The maximum ascorbic acid was recorded in “Surka Chitti” followed by “Mirzapur Seedling” and the minimum was recorded in “Dharward”.The sodicity tolerant genotypes identified based on the yield and quality parameters are “Nasik”, “Mirzapur Seedling”, “Surka Chitti Natputani”, “Allahabad Safed”, “Benaras”, “Panneer Guava”, “Lalit”, “Chittidhar White”, “Surka Chitti, Chakkaiya Ruthumanagar, Hafsi and Lucknow 49.

The elite genotypes with desirable character from this study can be used for hybridization process for sodicity problem area which would get in a good hybrid. Nasik, Mirzapur Seedling, Allahabad Safeda, Surka Chitti and Benaras were identified as superior genotypes for physico-chemical and yield parameters which can be utilized in crop improvement programme. These genotypes were superior in terms of the fruit quantity and quality and can be singled out

for cultivation and also are valuable gene pools for breeding programs. Red pulp genotypes, Red Fleshed, Hafsi, Lalit and Phili Pink may be studied for processing into various value-added products like jelly, jam, guava puree, RTS and dehydrated fruits. Considering all, this study highlighted that the morphological, yield and quality properties of guava were strongly affected by the genotype. The present study also increased knowledge about the phenotypic variation and quality properties of guava fruits and can be useful for producers, breeders and processors. For High yield, soft seeded, high ascorbic acid content and bigger fruits are the criteria for direct selection of the superior genotypes suitable for cultivation in sodic soil conditions.

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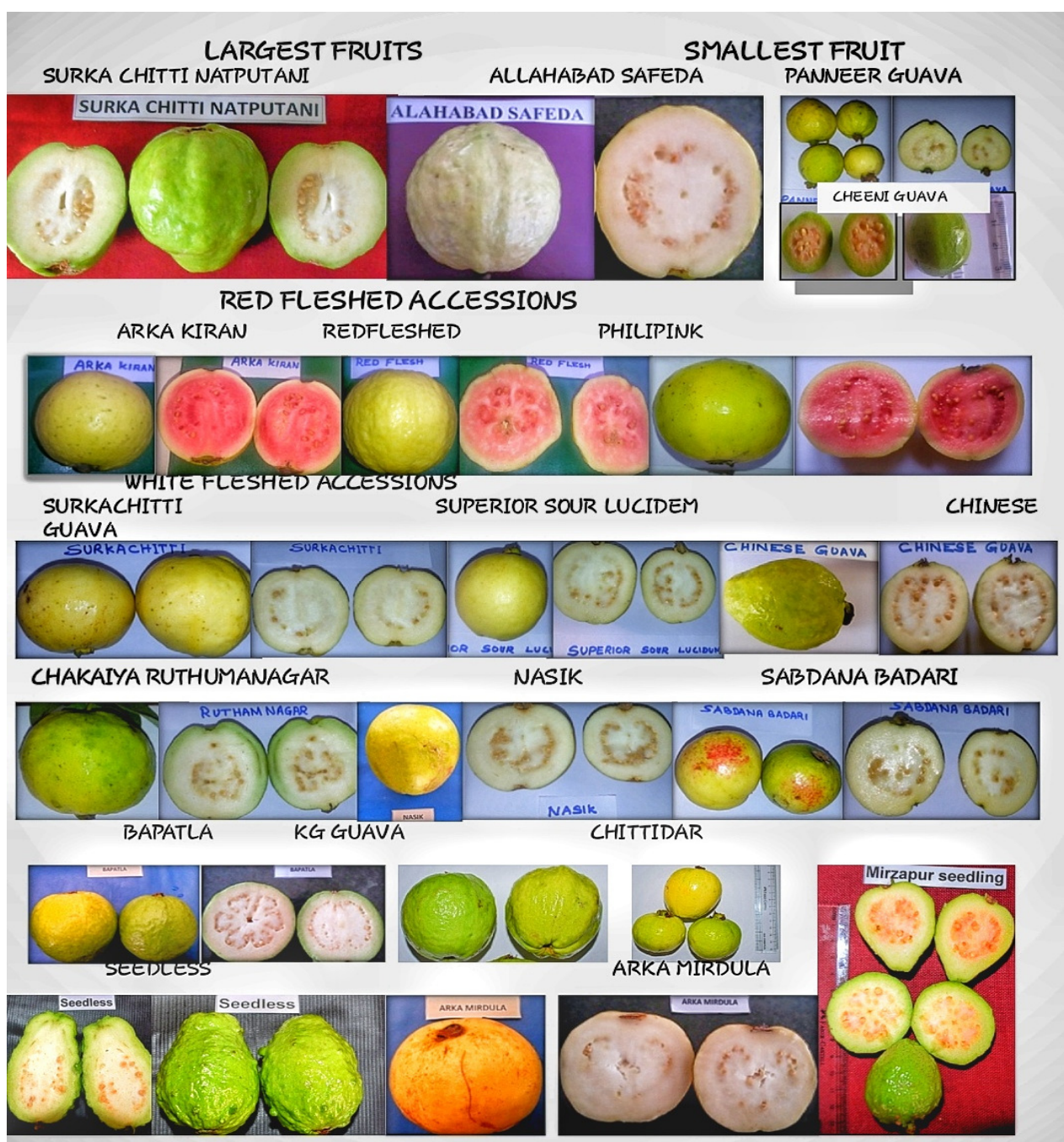


Fig. 1 : Variability in guava (*Psidium guajava* L.) germplasm under sodic condition

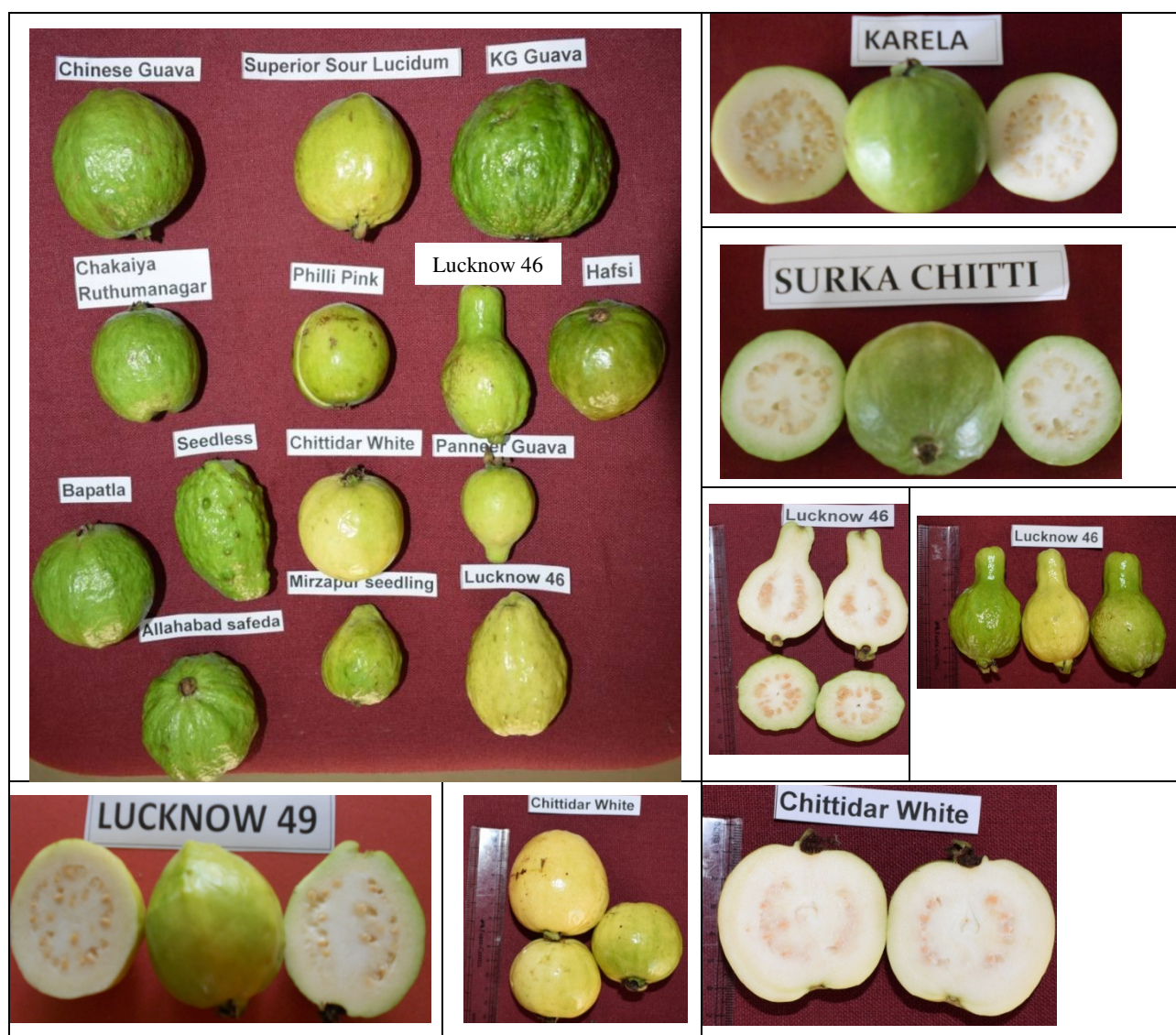


Fig. 2 : Variability in guava (*Psidium guajava* L.) germplasm under sodic condition

Table 1 : Pooled Mean of growth parameters of guava for sodicity tolerance (2015-16 to 2018-19).

Sl. No	Name of the Accession	Plant Height (m)	Plant circumference (cm)	Plant spread (E-W) (m)	Plant Spread (N-) (m)	Plant type	Stem type	Leaf shape	Leaf margin	Leaf base
1.	Red fleshed	1.66	16.66	1.61	1.99	Spreading	Rough	Elliptical	Entire	Obtuse
2.	Arka kiran	2.31	19.64	1.95	1.73	Spreading	Rough	Elliptical	Entire	Obtuse
3.	Benaras	2.14	13.24	1.41	1.97	Spreading	Rough	Elliptical	Entire	Obtuse
4.	Chakaiya Ruthumanagar	1.66	18.58	1.70	2.18	Spreading	Smooth	Elliptical	Entire	Oblique
5.	Dareedar	1.64	18.29	1.52	2.27	Spreading	Rough	Elliptical	Entire	Obtuse
6.	Dharwad	1.66	20.37	2.49	1.71	Spreading	Rough	Oblong	Entire	Obtuse
7.	Karela	1.69	10.49	1.28	1.30	Spreading	Smooth	Elliptical	Entire	Obtuse
8.	Mirzapur seedling	2.67	21.37	2.86	3.12	Erect	Smooth	Elliptical	Undulate	Oblique
9.	Nasik	1.91	9.90	1.60	1.64	Spreading	Smooth	Oblong	Entire	Acute
10.	Philli Pink	1.51	16.26	2.86	2.58	Spreading	Rough	Elliptical	Entire	Oblique
11.	Sabdana Badari	1.63	10.41	2.02	2.56	Spreading	Rough	Elliptical	Entire	Oblique
12.	Superior Sour Lucidum	2.43	10.92	2.37	2.18	Spreading	Rough	Elliptical	Entire	Obtuse
13.	Surka Chitti	1.44	18.58	2.54	1.71	Spreading	Rough	Elliptical	Entire	Obtuse
14.	Surka Chitti Natputani	4.36	22.27	3.30	3.26	Erect	Smooth	Elliptical	Undulate	Obtuse
15.	Lalit	2.55	12.86	2.09	2.29	Spreading	Rough	Elliptical	Entire	Obtuse
16.	Chinese Guava	1.88	19.39	2.25	2.28	Spreading	Rough	Elliptical	Undulate	Obtuse
17.	Lucknow 49	1.90	20.79	1.84	1.85	Spreading	Rough	Lanceolate	Undulate	Obtuse

18.	Allahabad Safeda	1.86	11.74	1.97	1.24	Spreading	Smooth	Elliptical	Undulate	Obtuse
19.	Bapatla	1.84	14.57	2.48	2.29	Spreading	Rough	Elliptical	Undulate	Obtuse
20.	Hafsi	1.80	13.24	1.68	2.27	Spreading	Rough	Elliptical	Undulate	Obtuse
21.	Lucknow 46	1.82	15.59	1.67	1.52	Spreading	Rough	Elliptical	Undulate	Obtuse
22.	Panneer Guava	1.70	15.37	1.65	1.45	Spreading	Rough	Elliptical	Undulate	Obtuse
23.	Chittidar	2.47	11.63	0.88	1.14	Spreading	Rough	Elliptical	Undulate	Obtuse
24.	TRY (G) 1	2.29	14.57	1.62	2.35	Spreading	Smooth	Elliptical	Undulate	Obtuse
25.	Chittidar White	2.67	19.36	2.55	3.12	Spreading	Smooth	Elliptical	Undulate	Obtuse
26.	Seedless	2.20	17.51	1.83	1.36	Spreading	Rough	Elliptical	Undulate	Obtuse
27.	Bangalore Round	1.79	9.71	1.10	1.26	Spreading	Rough	Elliptical	Undulate	Obtuse
28.	KG Guava	1.62	10.83	1.31	0.94	Spreading	Rough	Elliptical	Undulate	Obtuse
29.	Local	2.00	8.98	1.79	1.16	Spreading	Rough	Elliptical	Undulate	Obtuse
30.	Red Guava	1.75	11.10	1.21	0.81	Spreading	Rough	Ovate	Undulate	Obtuse
31.	Cheeni Guava	1.12	8.74	0.68	0.76	Erect	Rough	Oblong	Undulate	Obtuse
	Mean	1.03	1.98	14.93	1.83	-	-	-	-	-
	SEd	0.298	0.9834	0.2715	0.2976	-	-	-	-	-
	CD (p: 0.05)	0.5923	1.9538	0.5393	0.5913	-	-	-	-	-
	CV%	21.27	9.31	20.97	26.52	-	-	-	-	-

Table 2 : Pooled Mean of Yield and Quality parameters of guava for sodicity tolerance (2015-16 to 2018-19)

Sl. No	Name of the Accession	Fruit length (cm)	Fruit diameter (cm)	Flesh thickness (cm)	Rind thickness (cm)	Hard /Soft (Seed)	Pulp colour
1.	Red fleshed	7.08	6.01	4.75	0.45	S	Pink
2.	Arka kiran	6.59	5.74	4.52	0.23	S	Dark Pink
3.	Benaras	7.75	6.75	4.03	0.39	H	white
4.	Chakaiya Ruthumanagar	6.60	6.27	5.00	0.41	S	white
5.	Dareedar	5.26	4.81	4.55	0.33	S	white
6.	Dharwad	6.76	5.95	4.26	0.39	H	white
7.	Karela	5.52	4.38	3.36	0.23	S	white
8.	Mirzapur seedling	7.50	6.43	3.59	0.21	S	Pink
9.	Nasik	7.12	5.92	4.47	0.23	S	white
10.	Philli Pink	5.79	4.39	5.10	0.23	S	Pink
11.	Sabdana Badari	7.18	5.60	4.82	0.56	S	white
12.	Superior Sour Lucidum	6.51	5.99	5.32	0.21	S	white
13.	Surka Chitti	8.83	6.85	5.91	0.48	H	white
14.	Surka Chitti Natputani	11.55	8.71	6.59	0.60	H	white
15.	Lalit	5.40	5.21	4.51	0.31	S	Pink
16.	Chinese Guava	6.27	6.45	4.58	0.27	H	white
17.	Lucknow 49	6.95	6.06	5.21	0.50	H	white
18.	Allahabad Safeda	7.80	6.78	5.59	0.11	S	white
19.	Bapatla	6.21	5.98	4.46	0.21	S	white
20.	Hafsi	5.49	4.61	4.46	0.31	S	Pink
21.	Lucknow 46	7.43	5.80	4.02	0.33	S	white
22.	Panneer Guava	4.57	3.72	1.96	0.23	H	white
23.	Chittidar	4.81	4.40	3.78	0.23	H	white
24.	TRY (G) 1	4.44	4.89	3.55	0.27	S	white
25.	Chittidar White	5.97	5.46	4.55	0.14	S	white
26.	Seedless	7.02	5.25	4.71	0.25	-	white
27.	Bangalore Round	4.23	3.59	2.93	0.58	H	white
28.	KG Guava	6.22	5.75	5.04	0.39	H	white
29.	Local	5.63	5.28	3.52	0.37	H	white
30.	Red Guava	5.43	4.83	3.83	0.31	H	White
31.	Cheeni Guava	2.73	2.41	1.63	0.14	H	Pink
	Mean	6.34	5.56	4.34	0.32		
	SEd	2.800	2.774	1.964	0.026	-	-
	CD (p: 0.05)	1.401	1.387	0.982	0.013	-	-
	CV%	13.52	15.28	13.55	2.422	-	-

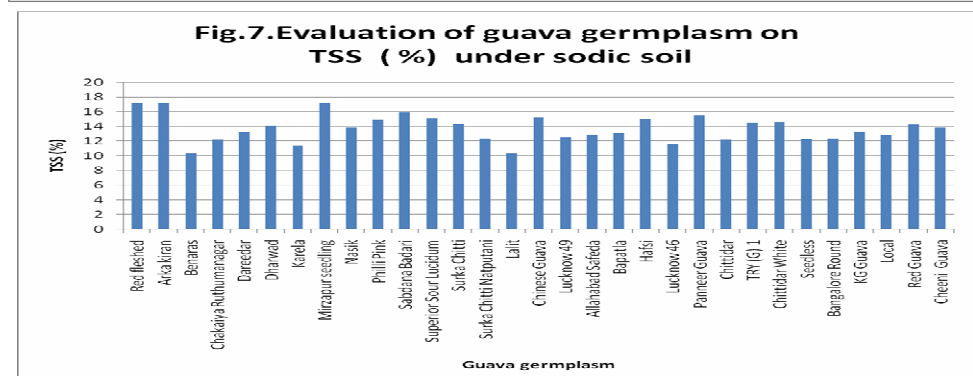
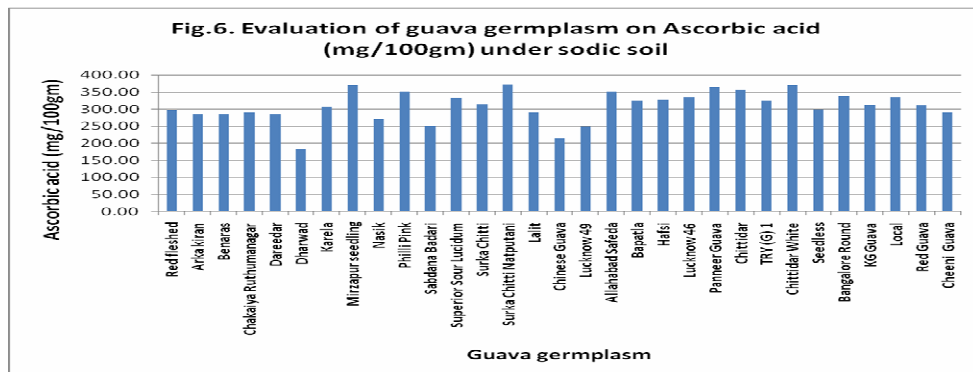
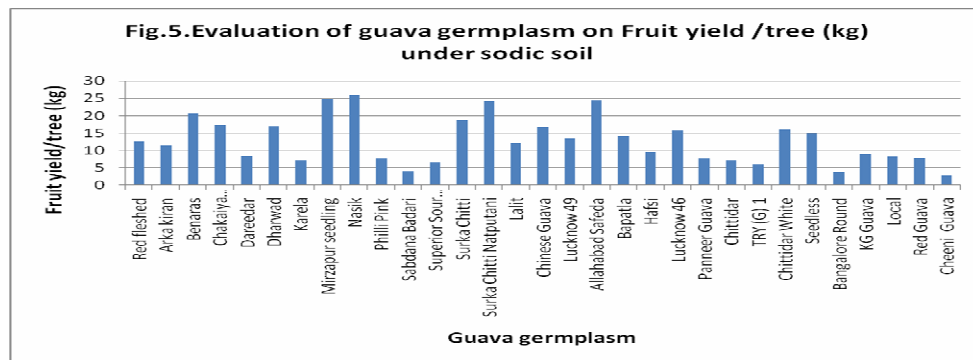
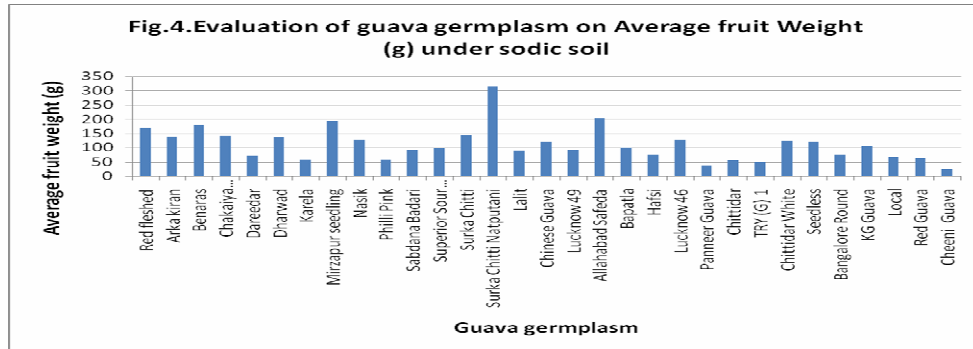
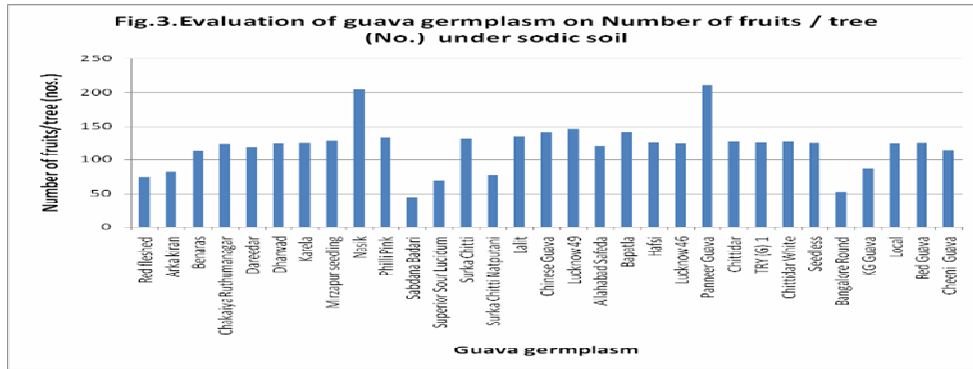


Fig. 3-7 : Evaluation of guava for yield and quality parameters under sodicity tolerance (2015-16 to 2018-19)

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